AMENDMENTS TO THE CLAIMS

A detailed listing of all claims that are, or were, in the present application, irrespective of whether the claim(s) remains under examination in the application are presented below. The claims are presented in ascending order and each includes one status identifier. Those claims not cancelled or withdrawn but amended by the current amendment utilize the following notations for amendment: 1. deleted matter is shown by strikethrough for six or more characters and double brackets for five or less characters; and 2. added matter is shown by underlining.

1. (Currently Amended) A method ~~Method~~ for estimating the movement between two numerical images, I_1 and I_2, having [[with]] luminances Y_1 and Y_2, respectively, for generating for each point of coordinates x,y of the image I_2 a movement vector $\vec{d}(x,y)=(d_{x1}d_y)$ [[so as]] to form an image $\hat{I}_2$ ~~from the image I_1~~ that is an approximation of the image I_2 with a luminance $\hat{Y}_2(x,y)=Y_1(x-d_{x1}y-d_y)$ from the image I_1, ~~which is an approximation of the image I_2, characterized in that it~~ wherein the method comprises the following steps:

(a) defining an initial model of finished elements, the model comprising a mesh~~ing~~ ~~whose~~ having nodes that are points of the image I_2, a movement vector associated with [[at]] each node of the [[said]] mesh[[ing]], and an interpolation formula for calculating the value of the movement vector of each point of the image I_2 from the values of the movement vectors of the nodes of the mesh to which the image I_2 [[it]] belongs,

(b) globally optimizing ~~optimising~~ the values of all the movement vectors of the initial model or a final model according to a differential method,

(c) calculating a variation E between the image $\hat{I}_2$ and the image I_2 for each finished element or mesh,

(d) carrying out a finer meshing on a discrete fraction of all the finished elements determined according to a criterion relating to the variation[[s]] E and allocating a movement vector to each new mesh[[ing]] node to define the final model of finished elements, and

(e) repeating [[the]] steps (b), (c) and (d) on the final model of finished elements obtained at the end of the preceding step (d) until a stoppage criterion is satisfied.

2. (Currently Amended) A method ~~Method~~ according to claim 1, ~~characterised in that, so as to carry out a finer meshing on a discrete fraction of all the finished elements in step (d), said set of~~ wherein the finished elements are [[is]] classified in [[the]] a decreasing order of [[their]] the variation[[s]] E of each finished element and [[the]] X first finished elements of the [[this]] classification are subdivided into smaller finished elements to carry out a finer meshing on a discrete fraction of the finished elements in step (d), wherein X represents[[ing]] a predetermined fraction of the number of finished elements in [[of]] the [[set]] model.

3. (Currently Amended) A method ~~Method~~ according to claim 1, ~~characterised in that, so as~~ wherein to carry out a finer meshing on a discrete fraction of the ~~set of~~ finished elements in step (d), the ~~set of~~ variation[[s]] E calculated in step (c) for each finished element is compared with a threshold variation that [[which]] depends on a [[the]] size of the finished element in question, and each of the finished elements having a [[whose]] variation[[s]] E [[are]] greater than the threshold variation [[are]] is subdivided into smaller finished elements.

4. (Currently Amended) A method ~~Method~~ according to claim 1, ~~characterised in that said~~ wherein the stoppage criterion [[is]] comprises a predeteremined number of finished elements constituting the model of finished elements defined by ~~to be reached at the end of~~ step (d).

5. (Currently Amended) A method ~~Method~~ according to claim 1, ~~characterised in that said~~ wherein the stoppage criterion ~~of step (e)~~ is satisfied when the variations E of the ~~set of~~ finished

elements defined by ~~of the model obtained at the end of the preceding~~ step (d) are smaller than a functional threshold variation that [[which]] depends on a [[the]] size of the finished elements in question.

6. (Currently Amended) A method ~~Method~~ according to claim 1, ~~characterised in that in addition~~ wherein for each numerical image I_1 and I_2, a set of R images I_i^r with a level of resolution r and luminance Y_i^r is defined, with r taking the values $(0,\ldots.R-1)$ and i taking the values 1 and 2 ~~is defined~~, [[the]] images I_1^0 and I_2^0 corresponding to the numerical images I_1 and I_2, respectively, and ~~in that~~ the steps (b) to (e) are carried out for each resolution level r from the level $r = R-1$ to the level $r = 0$.

7. (Currently Amended) A method ~~Method~~ according to claim 6, ~~characterised in that~~ wherein the sets of R images with resolution level r are obtained by filtering the images I_1 and I_2 along [[the]] two directions x and y using a low-pass filter with a pulse response h_n^r, each image I_i^r being defined by the ~~following~~ equation:

$$Y_i^r(x,y) = \sum_{u=-M}^{M} \sum_{v=-M}^{M} Y_i(x-u, y-v) h_u^r h_v^r,$$

wherein [[with]] M is a natural integer.

8. (Currently Amended) A method ~~Method~~ according to claim 7, ~~characterised, in that~~ wherein the pulse response h_n^r is defined as ~~follows~~:

$$h_n^r = \frac{{}^{r}_{n}}{S} \quad \text{[[avec]] wherein} \quad S = \sum_{n=-M}^{M} s_n^r$$

$$s_n^r = 2B.\sin c(2\pi B_r n) = 2B\frac{\sin 2\pi B_r n}{2\pi B_r n}$$

$$B_r = \frac{1}{2^{r+1}}$$

wherein B [[being]] is a natural integer.

9. (Currently Amended) A method ~~Method~~ according to claim 1, ~~characterised in that~~ wherein the ~~initial~~ movement vectors are nil vectors when the initial model is defined.

10. (Currently Amended) A method ~~Method~~ according to claim 1, ~~characterised in that~~ wherein the variation E between the image $\hat{I}_2$ and the image I_2 for each finished element e is defined by the ~~following~~ equation:

$$E = \sum_{(x,y)\in e} DFD^2(x,y)$$

wherein $DFD(x,y) = Y_2(x,y) - Y_1(x-d_x, y-d_y)$.

11. (Currently Amended) A method ~~Method~~ according to claim 1, ~~characterised in that~~ wherein the interpolation formula for calculating the value of the movement vector of a point P of coordinates (x,y) in the image I_2 belonging to a [[the]] finished element e with vertices P_i, P_j and P_k with respective coordinates $(x_i,y_i),(x_j,y_j)$ and [[et]] (x_k,y_k) is ~~the following~~:

$$\vec{d}(x,y) = \sum_{l=i,j,k,} \Psi_l^e(x,y).\vec{d}(x_l,y_l)$$

wherein Ψ_l is a function of the form:

$$\begin{cases} \begin{cases} \Psi_l(x,y) = \alpha_l + \beta_l x + \gamma_l y & (x,y)\in e \\ \sum_{l=i,j,k} \Psi_l(x,y) = 1 \end{cases} \\ \Psi_l(x,y) = 0 & (x,y)\in e. \end{cases}$$

12. (Currently Amended) A method ~~Method~~ according to claim 1, ~~characterised in that~~ wherein the differential method for optimizing ~~optimising~~ the movement vectors is [[the]] a Gauss-Newton method.

13. (Currently Amended) A method ~~Method~~ according to claim 12, ~~characterized in that~~ wherein the differential method for optimizing ~~optimising~~ the movement vectors is [[the]] a Marquardt extension of the Gauss-Newton method.

14. (Currently Amended) A method ~~Method~~ according to claim 1, ~~characterised in that~~ wherein a compactness constraint is imposed on each finished element ~~at the time of optimising~~ when the movement vectors of the initial model of finished elements are optimized, [[said]] the constraint ~~consisting of~~ preventing a [[the]] compactness of each finished element from approaching ~~tending to~~ zero.

15. (Currently Amended) A method ~~Method~~ according to claim 14, ~~characterised in that~~ wherein the compactness constraint on a finished element e with vertices P_i, P_j, P_k and compactness C (P_i, P_j, P_k) is defined by the ~~following~~ equation:

$$C\left(P_i + \vec{d}_{P_i}, P_j + \vec{d}_{P_j}, P_k + \vec{d}_{P_k}\right) \geq K \times C(P_i, P_j, P_k)$$

wherein $\vec{d}_{P_i}, \vec{d}_{P_j}$, [[*et*]] and $\vec{d}_{P_k}$ represent the movement vectors of the vertices P_i, P_j, P_k during the optimization ~~optimisation~~ step, and K is a compactness parameter.

16. (Currently Amended) A method ~~Method~~ according to claim 14, ~~characterised in that~~ wherein the optimization ~~optimisation~~ of the movement vectors under the compactness constraints on the finished elements is resolved by [[the]] an increased Lagrangian technique.

17. (Currently Amended) A method ~~Method~~ according to claim 16, ~~characterised in that~~ wherein the constraints are used in a linearized ~~linearised~~ form in the increased Lagrangian technique.

18. (Currently Amended) A method ~~Method~~ according to claim 1, ~~characterised in that~~ wherein optimizing the values of ~~the methods for optimising~~ the movement vectors uses an LDL^t profile technique.

19. (Currently Amended) ~~Application of the~~ A method ~~for estimating movement between two numerical images~~ according to claim 1, wherein the meshing carried out on the discrete fraction of the finished elements ~~for coding images, characterised in that the fractional subdivision of the meshing carried out~~ in step (d) ~~of the movement estimation method~~ is associated with a partially quaternary tree in which each level represents a meshing level and each node represents a triangle of the given level, and wherein ~~in that what is generated is~~ a binary train describing [[said]] the tree is generated for coding the images.

20. (Currently Amended) ~~Application of the~~ A method ~~for estimating movement between two numerical images~~ according to claim 19, ~~characterised in that~~ wherein the movement vectors associated with each node of the [[said]] tree are encoded differentially with respect to the movement vectors of [[their]] a father node when the father node ~~latter~~ exists, and wherein the movement vectors are ordered in [[said]] the binary train along a width passage of the [[said]] tree.

21. (Currently Amended) ~~Application of the~~ A method ~~for estimating movement between two numerical images~~ according to claim 1, wherein the meshing carried out on the discrete fraction of the finished elements ~~for decoding images, characterised in that the fractional subdivision of the meshing carried out~~ in step (d) ~~of the movement estimation method~~ is associated with a partially quaternary tree in which each level represents a meshing level and each node represents a triangle of the given level, and wherein the ~~in that said~~ tree is generated from a binary train of encoded data describing the [[said]] tree for decoding the images.

22. (Currently Amended) ~~Application of the~~ A method ~~for estimating movement between two numerical images~~ according to claim 21, wherein ~~characterised in that~~ the encoded data relating to a given level of the tree [[are]] is collectively regrouped in the binary train [[so as]] to generate the tree level by level as the binary train is read.

23. (Currently Amended) ~~Application of the~~ A method according to claim 1, wherein [[to]] at least one ~~of the~~ range[[s]] belongs[[ing]] to a [[the]] group consisting of the following ranges:

- compression of sequences of images, and
- compression of data in spaces larger than 2.